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Walk on the Wild Side: Explore Your Public Lands

Activity Book

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2004

Acknowledgments

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The authors would like to express their appreciation to the following BLM colleagues for their assistance: Harley Armstrong, Bibi Booth, Steve Borchard, Richard Brook, Pat Durland, Jim Goodbar, Rem Hawes, Sherri Hendren, Mary Knapp, Frances Philipek, Elizabeth Rieben, Melinda Ritacco, Tom Roberts, and Mary Tisdale.

Prepared by, and available from, the Bureau of Land Management
Environmental Education & Volunteers Group
1849 C Street, NW, LS-406
Washington, D.C. 20240
Telephone: (202) 452-5078

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U.S. Department of the Interior
Bureau of Land Management
First printing 2000
Second printing 2001
Third printing 2004
BLM/WO/GI-00/04+1115
printed on recycled paper

#58720445 ID 88069043 HD 216 .S63 2004

To Teachers and Parents

This booklet is designed to introduce you and your children to America's public lands. These lands belong to the American people, but they are also home to over 3,000 species of fish and wildlife, as well as a diversity of plant species. Historic and archaeological sites, as well as scenic wonders, abound. In this activity book, you and the children in your life will learn about some of the many natural and cultural resources that can be found on public lands and how you can enjoy them. You'll also learn about the importance of protecting these special places.

Several departments of the United States government manage public lands for us. So do state and local governments. This booklet focuses on lands under the jurisdiction of the Bureau of Land Management (BLM), an agency within the U.S. Department of the Interior. Created more than 50 years ago, the BLM is a little agency with a big job. It has fewer than 10,000 permanent employees–fewer people than the city of Albuquerque, New Mexico public school district employs. In spite of this, the BLM is responsible for nearly one-eighth of the land in the entire U.S.–106 million hectares (262 million acres) located mainly in the western states and Alaska.

Today, these lands represent a priceless legacy that must be conserved for future generations–an ever more challenging task as the population of the West continues to grow. To help meet this challenge, the BLM recently established the National Landscape Conservation System, which includes National Monuments, National Conservation Areas, and other specially designated areas. These are some of the most remarkable and rugged landscapes in the United States.

BLM lands offer a rich array of recreational, educational, and volunteer opportunities. For more information about what to see and do on BLM lands, you can contact a BLM office near you. There is a list of state offices in the Appendices of this booklet, and more information can be found at the BLM websites (see addresses at right). You can also check the Blue Pages of your local telephone directory for the BLM office nearest you.

—BLM on the Web—

BLM National Website: www.blm.gov
BLM Environmental Education Resources:
www.blm.gov/education
BLM Volunteer Program:
www.blm.gov/volunteer
Recreational Opportunities on Public Lands:
www.recreation.gov

Whether they're managed by the BLM, another Federal agency, your state, or your local community, public lands really do belong to you and to all Americans. Visit your public lands and get to know them–their sights, their sounds, their smells. By doing so, you will develop a personal connection and a commitment to preserving America's big backyard.

Standards of Learning

Information and activities in this booklet have been prepared for children primarily in third through fifth grades. They apply to the following standards of learning:

National Science Education Standards (National Academy of Sciences)

Content Standard C: Life Science–organisms and environments; populations and ecosystems; diversity and adaptations of organisms

Content Standard D: Earth and Space Science–properties of earth materials; changes in earth; earth's history

Content Standard F: Science in Personal and Social Perspectives–populations, resources, and environments; natural hazards; science and technology in society

Benchmarks for Science Literacy (American Association for the Advancement of Science)

4. The Physical Setting
   C. Processes That Shape the Earth
5. The Living Environment
   A. Diversity of Life
   D. Interdependence of Life
   E. Flow of Matter and Energy

National Geography Standards (National Council for Geographic Education)

Standard 4. The Physical and Human Characteristics of Places
Standard 7. The Physical Processes That Shape the Patterns of Earth's Surface
Standard 8. The Characteristics and Spatial Distribution of Ecosystems on Earth's Surface
Standard 14. How Human Actions Modify the Physical Environment
Standard 16. The Changes That Occur in the Meaning, Use, Distribution, and Importance of Resources
Standard 17. How to Apply Geography to Interpret the Past
Standard 18. How to Apply Geography to Interpret the Present and Plan for the Future

Curriculum Standards for Social Studies (National Council for the Social Studies)

Strand 3. People, Places, and Environment
Strand 10. Civic Ideals and Practices

Excellence in EE–Guidelines for Learning K-12 (North American Association for Environmental Education)

Strand 2.1A Processes That Shape the Earth
Strand 2.2A Organisms, Populations, and Communities
Strand 2.2C Systems and Connections
Strand 2.2D Flow of Matter and Energy
Strand 2.4A Human/Environment Interactions
Strand 2.4B Places
Strand 2.4C Resources
Strand 4B Recognizing Citizens' Rights and Responsibilities
Strand 4D Accepting Personal Responsibility

While the above standards are strongly emphasized in the classroom, reinforcement of these topics at home (and on visits to public lands!) should help your child in school by adding to his or her understanding of key concepts related to science, geography, social studies, and the environment.

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America's Public Lands

Did you know that there are millions of acres of land in this country that belong to you? 240 million hectares (600 million acres), to be more specific. This land is not owned by any individual or company. Instead, it's Federal land and it's owned by the American people . . . and that means you!

The U.S. government takes care of Federal lands. The U.S. Forest Service, the National Park Service, and the U.S. Fish & Wildlife Service are responsible for some of these Federal public lands. And so are other Federal agencies. But the Bureau of Land Management (BLM) takes care of the most–106 million hectares (262 million acres). That's almost equal to all the land in the states of Texas and California put together! BLM's main job is to keep public lands healthy, so that you can enjoy the lands now and so that young people like you can enjoy them for many years to come.

Most BLM lands are found in the western states and Alaska. In the eastern United States, BLM manages only about 12,000 hectares (30,000 acres)–mostly small, isolated areas scattered through 31 states. (These areas are too small to be seen on the map on page 5.) The agency also owns 283 million hectares (700 million acres) of underground mineral rights located throughout the country.

ACTIVITY Map Talk

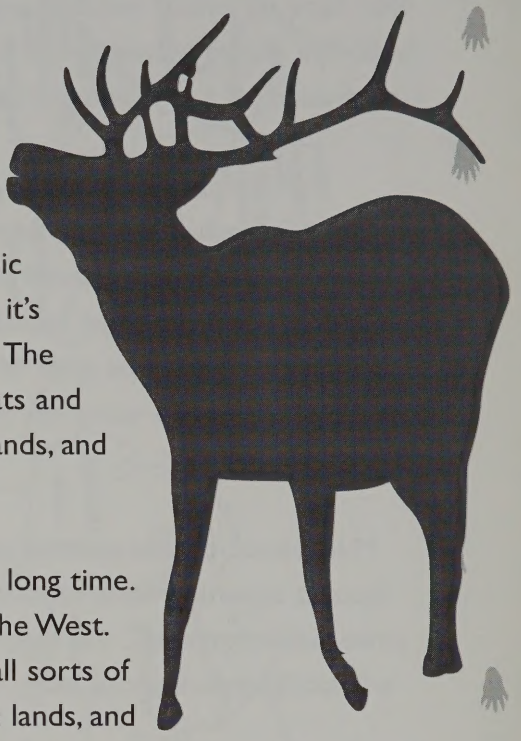
- Look at the map on the next page. Can you find your state?
- Where in your state do you live? Put a mark there.
- Use the map key to find the BLM land. Which BLM land is closest to you?
- Draw a line from the mark where your home is to the nearest BLM land. About how many kilometers (or miles) away is it? Ask a grown-up if you need help reading the scales at the bottom of the map.
- Does your state have a lot of BLM land or a little? Estimate how much of your state is BLM land. Is it one-fourth or less? Less than one-half? More?
- Find two states that have a lot of BLM land.

Map Talk

Washington
Seattle
Olympia
Spokane
Richland
Coeur d' Alene
Great Falls
Havre
Malta
Glasgow
Missoula
Helena
Butte
Lewistown
Montana
Cottonwood
Portland
Salem
Eugene
Prineville
Baker
Oregon
Roseburg
Medford
Lakeview
Vale
Boise
Salmon
Dillon
Billings
Miles City
Idaho
Idaho Falls
Shoshone
Burley
Malad City
Cody
Buffalo
Gillette
Worland
Newcastle
Pinedale
Lander
Casper
Kemmerer
Wyoming
Rawlins
Rock Springs
Cheyenne
Eureka
Cedarville
Redding
Susanville
Winnemucca
Elko
Battle Mountain
Ukiah
Reno
Carson City
Sacramento
Nevada
Ely
San Francisco
Santa Cruz
Tonopah
Bishop
California
Caliente
Las Vegas
Ridgecrest
Bakersfield
Los Angeles
Needles
Kingman
Palm Springs
San Diego
Yuma
Salt Lake City
Utah
Vernal
Price
Fillmore
Cedar City
Escalante
Moab
Kanab
Monticello
Craig
Glenwood Springs
Denver
Grand Junction
Colorado
Gunnison
Canon City
Durango
Alamosa
Flagstaff
Arizona
Phoenix
Tucson
Safford
Sierra Vista
Farmington
Taos
Santa Fe
Albuquerque
New Mexico
Socorro
Roswell
Las Cruces
Hobbs
Carlsbad
North Dakota
Dickinson
Bismarck
South Dakota
Belle Fourche
Pierre
Nebraska
Lincoln
Kansas
Topeka
Oklahoma
Oklahoma City
Texas
Austin
Minnesota
St Paul
Iowa
Des Moines
Missouri
Jefferson City
Arkansas
Little Rock
Louisiana
Baton Rouge
Wisconsin
Madison
Illinois
Springfield
Michigan
Lansing
Indiana
Indianapolis
Ohio
Columbus
Kentucky
Frankfort
Tennessee
Nashville
Mississippi
Jackson
Alabama
Montgomery
Georgia
Atlanta
Florida
Tallahassee
South Carolina
Columbia
North Carolina
Raleigh
Virginia
Richmond
West Virginia
Charleston
Washington, DC
Pennsylvania
Harrisburg
New York
Albany
Vermont
Montpelier
New Hampshire
Concord
Maine
Augusta
Massachusetts
Boston
Rhode Island
Providence
Connecticut
Hartford
New Jersey
Trenton
Delaware
Dover
Maryland
Annapolis
Alaska
Kotzebue
Nome
Fairbanks
Tok
Glennallen
Anchorage
Juneau
Hawaii
Honolulu
APPROXIMATE SCALE
for Alaska
400
800 km
250
500 mi
APPROXIMATE SCALE
for Hawaii
220
440 km
135
270 mi
SCALE
APPROXIMATE SCALE
for lower 48 states
175
350 km
110
220 mi
KEY
Public Lands Administered by the Bureau of Land Management
(Scattered parcels of BLM land in the eastern states are too small to be seen on a map of this scale.)

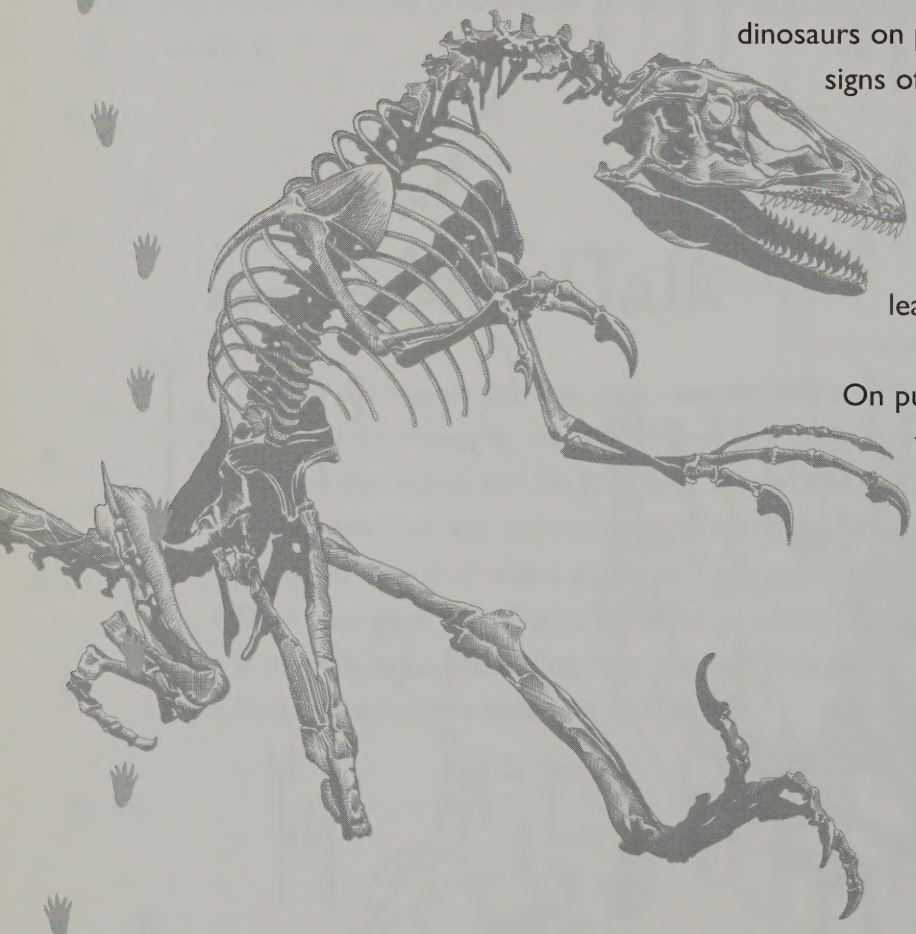
Pack Your Bags for a BLM Road Trip!

What Can You See?



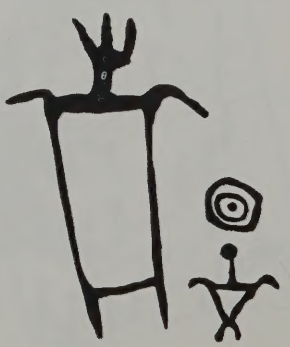
If you visit BLM lands, you might find yourself in a desert or a forest, on a glacier or a mountain trail, on open rangeland, along a scenic river, or deep inside a cave. With such a great variety of landscapes, it's not surprising that you can find many types of plants on BLM lands. The soil, water, and plants provide a good home for wildlife, too–from bats and beetles to bighorn sheep and elk. Sheep and cattle graze on rangelands, and wild horses and burros can also be found in many areas.

There's plenty of action on BLM lands . . . and there has been for a long time. In fact, dinosaurs once roamed through the wide open spaces of the West. Scientists have found fossils of all sorts of dinosaurs on public lands, and signs of many other ancient creatures as well.



People have lived in America's western lands for a long time, too. Prehistoric rock paintings and artifacts help scientists learn about the history of Native Americans.

On public lands, you'll also find natural resources that we depend on: trees for lumber and paper products; energy resources such as coal, oil, and gas; and other minerals we use every day.



I Spy Scramble

You can see many things on a tour of BLM lands. Depending on where you travel, you might see: mountains, rivers, deserts, glaciers, caves, insects, birds, reptiles, fish, mammals, flowers, and trees, as well as fossils, arrowheads, and oil wells. Below is a list of these things, but the words are all scrambled. First unscramble the words. Then answer the question at the bottom of the page by copying the letters from the numbered boxes into the numbered spaces.

HISF ☐☐☐☐

RISDB ☐☐☐☐☐

SMMAALM ☐☐☐☐☐☐☐ (8)

SLIPETER ☐☐☐☐☐☐☐☐ (4)

SESTICN ☐☐☐☐☐☐☐ (12)

LORSFEW ☐☐☐☐☐☐☐ (10)

STERE ☐☐☐☐☐

NIATUMSON ☐☐☐☐☐☐☐☐☐ (6)

SERDEST ☐☐☐☐☐☐☐

GRSAILCE ☐☐☐☐☐☐☐☐ (7 11)

VISRER ☐☐☐☐☐☐ (1)

SEAVC ☐☐☐☐☐ (9)

LOI WSLEL ☐☐☐ ☐☐☐☐☐ (3)

SLOFSIS ☐☐☐☐☐☐☐ (5)

HEDOSWARRA ☐☐☐☐☐☐☐☐☐☐ (2)

What is something you won't see on BLM lands? ☐☐☐☐☐☐☐☐ ☐☐☐☐☐

1 2 3 4 4 5 6 7 8 9 10 11 12

What Can You Do?

Many people like to have fun on BLM lands. People can visit BLM lands to get close to nature, to see wildlife and native plants. Some people like to go rafting on the rivers, while others like to visit ghost towns, prehistoric sites, or dinosaur tracks. Still others like to ride their mountain bikes on trails through the forest or the desert. Campers, hunters, hikers, rock climbers, cross-country skiers, trail vehicle fans, and snowmobilers all come to enjoy BLM lands.

People use BLM lands in other ways too. Miners mine coal, gold, and other minerals, as well as sand and gravel. Ranchers use the grasses and shrubs to feed their cows and sheep. Timber companies harvest trees. Towns can obtain land from BLM for parks and schools. Indian peoples carry out their traditions on BLM lands, too. They gather special foods, such as pine nuts, or materials to make crafts.

ACTIVITY

Just Imagine

What would you most enjoy doing on BLM land with your best friend? With your family? Draw a picture of yourself and your companions enjoying an outing on BLM land.

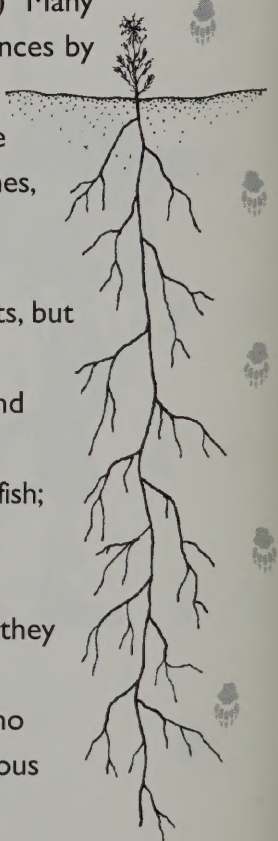
Silent Invaders

BLM works to keep the land as healthy as it can be. Sometimes it's not easy. Human activities often create problems, and natural forces can add to the challenge of protecting public lands. We'll look at a few of the challenges, one at a time. Let's look at a problem with "aliens" first.

Did you know that aliens have invaded many areas of the United States? No, not aliens from outer space, but alien plant species, also known as invasive weeds. Invasive weeds usually come from other countries or regions. They spread rapidly and they can do a lot of damage, especially to native plants–those plants that grow naturally in the area.

Scientists estimate that invasive weeds are spreading at a rate of about 1,750 hectares (4,300 acres) each day on public lands in the West. That would cover an area larger than the state of Delaware in just one year! Invasive weeds can spread easily because most often there are no natural controls on their growth. Their enemies, such as disease and predators, were left behind.

Invasive weeds also have special characteristics that help them get a head start on native plants. Many have a long root system (see illustration at right), which makes it easier for the plant to get water. (Especially in dry areas, much of the water supply is located deep underground.) Many weeds are tall and bushy and have hundreds of seeds. The seeds can travel great distances by wind or water, or they can "hitchhike" on wildlife, horses, livestock, and people–and on people's cars and trucks, too. Some invasive weeds grow tall quickly and keep the sun from reaching smaller, slow-growing native plants. Still others grow in dense patches, crowding out native plants.



Invasive plants not only damage native plants, but they can also:

- endanger wildlife and livestock that depend on native plants for food and shelter;
- increase soil run-off into streams, damaging fish;
- absorb more water, leaving less for native plants and wildlife;
- increase the problem of wildfire because they burn better and faster; and
- cause problems for hikers and animals who come into contact with thorny or poisonous plant parts.

—Help Wanted!—

Invading plants are costly to remove or control. That's why land managers need your help to prevent them from getting started in the first place. Check with a local naturalist or extension agent to find out which invasive weeds are a threat in your area. To help:

- leave the plants alone and report all sightings to local extension agents, land managers, rangers, or conservationists;
- remove all weed seeds from clothing, shoes, pets, camping gear, and tire treads; and
- don't pick "wildflowers" or any plants. They could be invasive weeds.

ACTIVITY

Where's Weedo?

Botany is the study of plants. Scientists who study plants are called botanists. They are specially trained to identify plants, and they can tell which plant is a weed and which is a native plant. They have to pay close attention when they work, so that they can find invasive plants before those plants get to be a problem.

Now you can work like a botanist does and find the invasive plants in the woods. Look for the four invasive plants pictured at the bottom of the page in the big picture, and circle them. Want an extra challenge? Use a field guide to try to identify the native plants shown in the picture.

Leafy Spurge

Garlic Mustard

Russian Knapweed

Dalmatian Toadflax

Burning Point

There's no doubt about it. Fire is dangerous! That's why you learn about fire safety when you're very young. You know, for example, that you should always give matches to an adult. But if you think about it, fire can also be useful. At home, your parents may barbecue delicious meals on the grill. A fire in the fireplace can keep you warm and cozy on wintry days.

Help your camp mates follow these campfire rules:

1. Make campfires only in designated areas.
2. Never leave a campfire unattended.
3. Always keep water near a campfire.

In nature, fires in forests and grasslands can be useful, too. In fact, some fires are actually needed to keep the land healthy. Fires in nature don't always burn with huge flames and great heat. Such smaller fires clean out leaves and dried grass that have built up over a few years. They help recycle dead plants, releasing nutrients into the soil. The nutrients help new grass and other plants to grow. Many animals like to eat the tender, nutritious plants that return after a fire.

In addition, some plants actually need fire. Certain pine cones won't open and drop their seeds without the heat of a fire. Fires can kill insects that harm trees. Even burned, dead trees are places where birds can nest or sit and watch for prey.

How to put out a campfire:

1. Drown the fire with water.
2. Use a stick to mix the ashes with the soil.
3. Scrape and chop partially burned sticks.
4. Add more water.
5. Stir with soil again.

To help keep the land healthy, trained fire specialists sometimes set fires. Conditions need to be just right, so that the fires do not get out of control. Fires started in the wrong conditions, without planning, or through carelessness can spread quickly and do a lot of damage. That's why if you live near wildlands or visit them, it's important to be very careful with fire and to follow fire safety rules.

—Did You Know...?—

. . . that most wild animals know how to live around fire? They can run or fly faster than most fires can move.

Little House Near the Wildlands

When homes and other buildings are located near wildlands, fire can easily spread to where people live. But people can help protect their homes from wildfires. Here's a house that's built near a forest. Can you find and color at least five things that make this house a fire hazard?

On the Edge

Riparian areas are the green, moist areas next to a lake, stream, or river where plants grow vigorously. In dry climates, where much BLM land is found, riparian areas are very important. The water itself and the plants alongside attract many different kinds of animals. The plants also help to prevent erosion, which occurs when soil washes into the water. A healthy riparian area helps keep the water clear and cool for fish and other aquatic animals.

A healthy riparian area

In many places in the West, riparian areas have been damaged. Trucks have been driven through streams, or roads have been built too close to the water. Logging and mining operations and other industrial activities have also been harmful to large areas surrounding streams. So have poor farming practices. In some places, too many cows or sheep grazed nearby. Other popular activities such as hiking, camping, boating, and biking have also weakened stream banks.

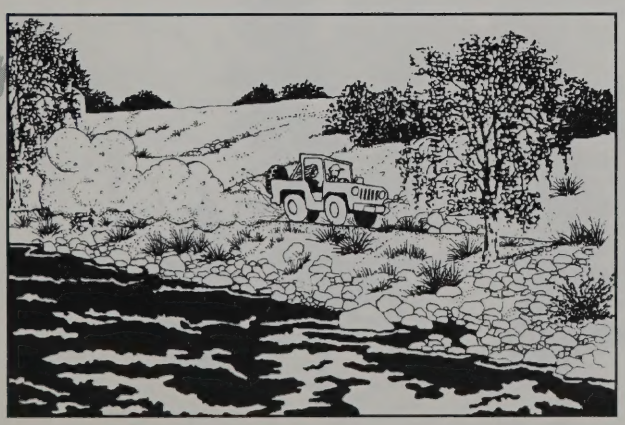
An unhealthy riparian area

All of these actions can destroy plants along the stream and cause stream banks to cave in. Erosion gets worse because there are fewer plants to hold the soil when it rains. The water becomes muddy. And it can get warmer, too, because there are no trees to shade the water. Warm, dirty water means trouble for native fish.

In many places, people are working to repair damaged riparian areas. They are planting trees along stream banks and moving roads away from the water's edge. They are building fences to control livestock grazing near streams. There's still plenty of work to do, but the water in many places is getting cleaner. And fish and wildlife are moving back into these riparian "ribbons of life."

Down by the Riverside

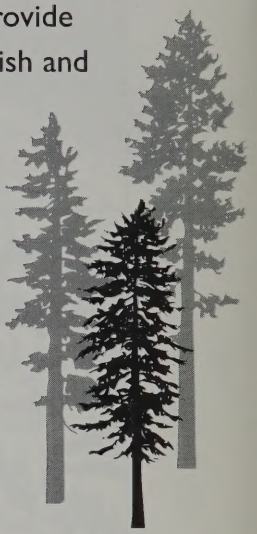
In each pair of pictures below, circle the activity that will allow the riparian area to stay healthy.



Forest Keepers

When you think of natural resources, do you think of trees? Trees are a natural resource people have been using for a very long time. Trees are burned for fuel and used to build homes and to make paper. Many people rely on timber from BLM forests.

But forests do much more than just provide trees and wood for people. Healthy forests provide habitat for wildlife, plants, and fungi. Healthy forests have healthy streams that are home to fish and other aquatic life. They also provide people with the chance to enjoy nature.



How can you tell when a forest is healthy? A healthy forest has many different kinds of trees growing in it–young and old trees, and different species as well. A healthy forest even has logs on the ground and standing dead trees, called snags. Many fungi and mosses live on these dead trees. A good mixture of trees and other plants means a variety of animals will be able to live in the forest. The food, water, and shelter that animals need to survive can all be found in a healthy forest.

We've learned many things about how to keep a forest healthy. We've also learned that roads in forests can be a big problem. Many of these roads were built to make it easier for timber companies to get logs out of the forest. Some of these roads can cause serious erosion. Soil in forest streams is harmful to fish and other creatures that depend on clean water for their survival. In some places, old logging roads are now being used by people interested in recreation. More traffic and people on forest roads disturb wildlife. BLM is working to protect wildlife habitat in its forests by removing some forest roads. The roadbed is dug up; then the area is replanted with a variety of seeds and seedlings.

As you can see, keeping forests healthy is no easy job. But it certainly is an important one! After all, people need forests, and so do many other living things.

Finding Forest Friends

This forest does more than just grow trees for people. It also makes a good home for animals, including an owl, a deer, a frog, a slug, a salamander, a beetle, a vole, a snake, a marten, and a bobcat. See how many you can find. Color each animal when you find it.

Creature Feature

Forests, rivers, canyons, deserts, tundra, rangelands: With so many wildlife habitats on BLM lands, you can be sure that all sorts of wildlife can be found there. BLM needs to protect animal habitats on the land it manages and still allow for other uses.

Loss of habitat is the reason most animals become endangered. And many things people do can cause loss of habitat. New homes, roads, and shopping malls often force animals from their homes. Damming a river to provide power or water for farms and cities threatens habitat for fish and all wildlife dependent on that river. Logging and mining operations can destroy wildlife habitats as well. And the spread of invasive weeds can threaten the food supply and shelter for native animals.

Tourists can also pose a threat to wildlife. As more people visit public lands, there's a greater chance that wildlife will be disturbed and their habitat damaged. People who use off-highway vehicles (OHVs) have to be particularly careful. OHVs include motorcycles, trail bikes, snowmobiles, four-wheel drive vehicles, and other vehicles that can be driven off paved roads. People on OHVs can travel farther into remote areas, where there's a better chance to see wildlife . . . and a better chance to disturb animals. That's why BLM has set aside trails on some of its lands for OHV use. By staying on the trails, OHV riders are less likely to disturb animals and their habitats.

—Endangered Species—

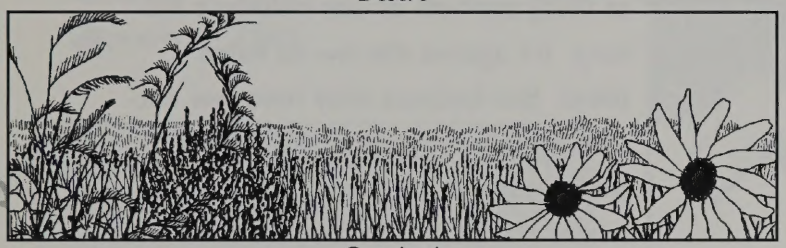
To find out more about endangered species in your state, check out the website of the U.S. Fish & Wildlife Service: **www.fws.gov**. Next, click on "Endangered Species." By clicking on "Species Information," you'll be able to get to the latest information on endangered plants and animals as well as lists of species that are threatened and endangered in your state. Then check with your local BLM office to find out what you can do to help.

OHVs are not the only problem. If you've visited BLM lands by car, by bike, or on foot, you've probably noticed that there are trails and designated parking areas in many places as well. These are designed to keep people from spreading out all over wildlife habitat. You wouldn't want all sorts of people walking through your home, would you? When you think about it, public lands do belong to people, but they also belong to the plants and animals that live there.

Habitat Match-up

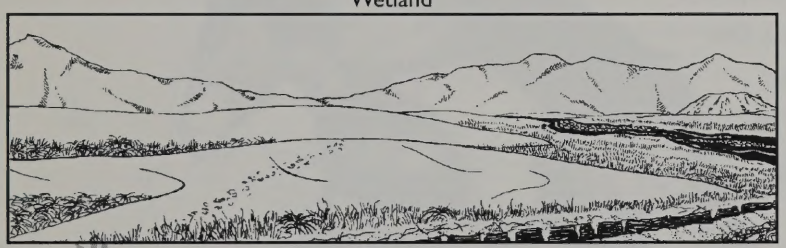
Animals are adapted to the habitats in which they live. This means they have characteristics that help them get what they need to survive there. Below, in the left column, are drawings of some of the habitats you'll find on BLM lands. On the right are some animals looking for a home. Draw a line from each animal to its habitat.

Desert



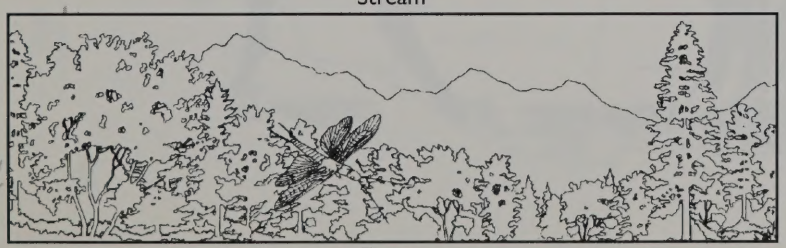
Grassland

Wetland



Tundra

Stream



Forest

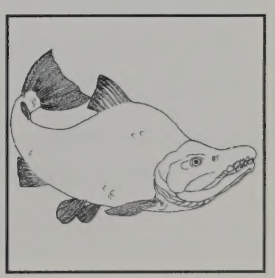
Bear

Frog

Prairie dog

Caribou

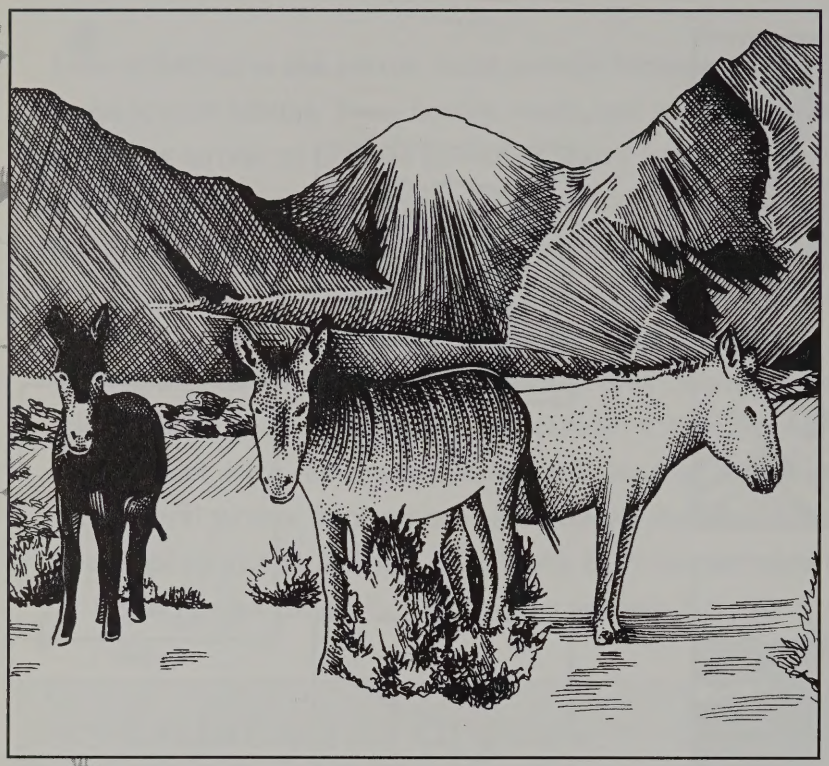
Short-horned lizard



Salmon

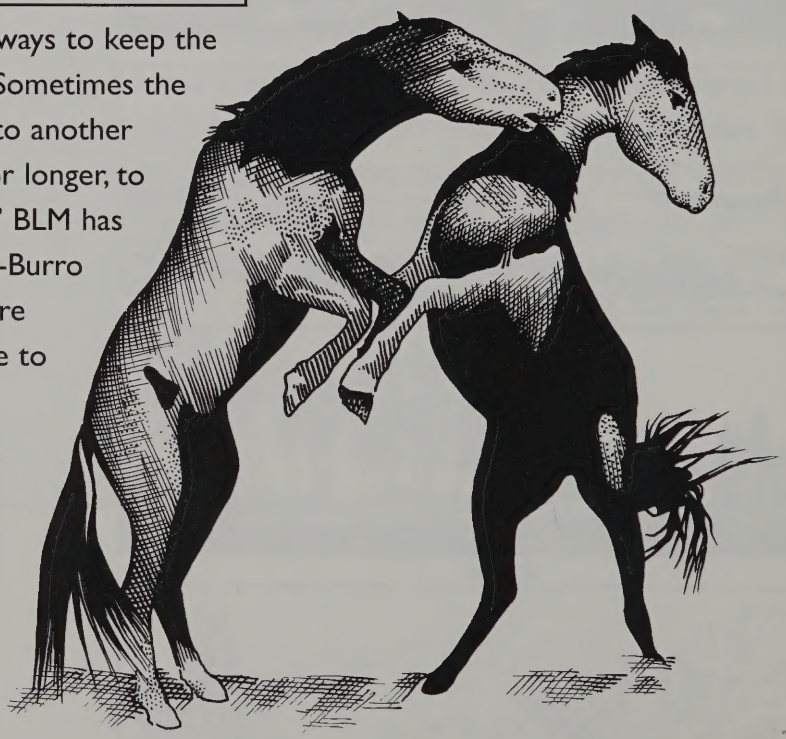
Horsing Around

When you think about wild animals of the West, you probably think of bears, mountain lions, elk, and deer. But did you know that nearly 40,000 wild horses and burros also make their homes on public lands? These animals are descended from horses and burros that escaped from or were set free by early explorers and settlers in the region. (Animals that were once domesticated, or tame, and are now wild are called "feral" animals.)



BLM protects wild horses and burros as living symbols of our country's history. It's against the law to harm them. But because they have few natural enemies, there's a danger that their numbers will grow to the point where the land can't support them. After all, not only do the horses and burros need food and water, but so do the wildlife and grazing cattle that also live on the rangelands.

BLM has chosen several different ways to keep the size of the herds under control. Sometimes the animals are gathered and moved to another area, either for a short time or for longer, to what are called "holding facilities." BLM has also set up the Adopt-a-Horse-or-Burro program in which these animals are made available for qualified people to adopt.



To Find Out More:

Check out the website of the Wild Horse and Burro Program:
www.wildhorseandburro.blm.gov

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Mustang Roundup

Below is a chart showing the number of wild horses and burros found in some of the western states as of 2003. (As you can imagine, it's not always easy to count wild horses and burros, so these are estimates.) But the names of the states are scrambled. Can you help? First, unscramble the state names and then put them in the proper blanks on the accompanying map. Then, color the states according to the map key.

States (scrambled) with the number of wild horses and burros in that state.

devana — 17,930
myongiw — 5,364
raicnilofa — 4,218
gonero — 2,885
athu — 2,621
naarozi — 2,613
hodia — 697
drolocao — 620
antoman — 170
ewn oxecim — 68

Color Key
< 1,000 — yellow
between 1,000 and 4,999 — blue
between 5,000 and 10,000 — green
> 10,000 — red

—Did You Know...?—

. . . that wild ponies can also be found on the East Coast of the United States? They live on islands off the coast of Maryland, Virginia, and North Carolina. To find out more about the ponies and to learn the names of the islands, check out the following National Park Service websites:

www.nps.gov/asis/horses.htm or **www.nps.gov/calo/hrs.htm**

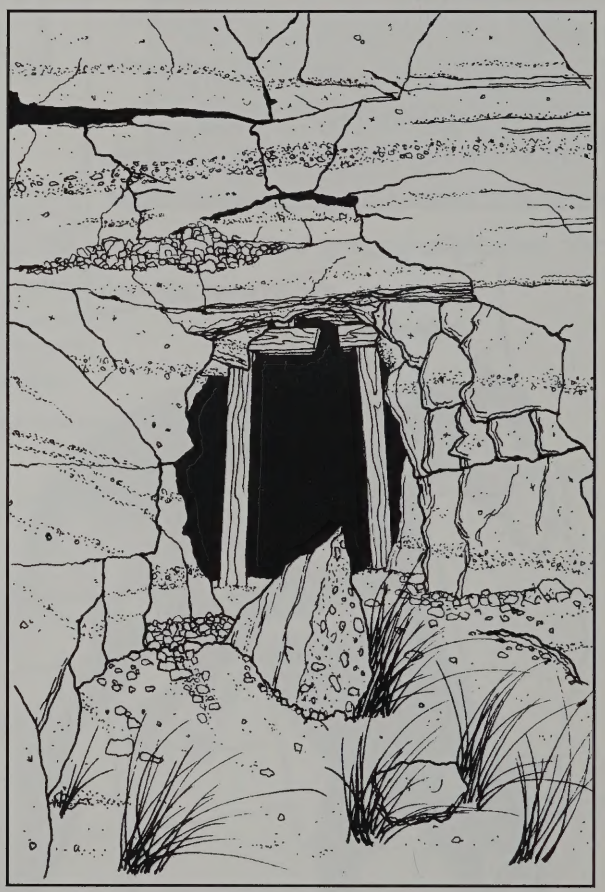
Riches from the Earth

The mineral resources found on public lands help to keep our country running smoothly. From computers to toothpaste to your bicycle–almost every product you can think of contains minerals. Chances are at least some of these minerals came from public lands. There's a good chance, too, that the electricity you use every day comes from a coal-powered plant. And it's America's public lands that supply much of the country's coal.

Managing all these resources is a tough job. We need the minerals, but the process of getting them out of the earth can damage the land and water and create other hazards. That's why BLM tries to make sure that mining companies follow strict rules that help protect the environment. Companies have to plan their operations carefully, choose the least damaging mining methods, and repair the land afterward.

Some of the biggest hazards come from mines that are no longer in use. Abandoned mines pose safety hazards to people visiting public lands. People can get lost or trapped, be overcome by poisonous gases, or fall down a mine shaft. Abandoned mines also may leak dangerous materials into the land and water for years. BLM is working to clean up and close down abandoned mines. In the meantime, if you come across an abandoned mine:

STAY OUT AND STAY ALIVE!



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Minerals Match

Do you know how much we rely on minerals? Here's a list of some minerals and other earth materials that Americans use every day, along with some of their uses. Match each of the minerals with the description of how it's used by writing the letter of the mineral in the space next to its description.

Quartz **A**
Gold **B**
Silver **C**
Iron **D**
Coal **E**
Sand & gravel **F**
Phosphates **G**
Copper **H**
Oil & gas **I**
Lead **J**

1. This mineral is burned in power plants to produce most of our country's electricity. ____

2. Flexible and shiny, this mineral makes good gutters, pipes, and electrical wiring. ____

3. Rings, earrings, watches–many kinds of jewelry are made from this shiny metal. ____

4. Used to manufacture steel, this mineral is also found in nails, magnets, and medicines. ____

5. This mineral is used in car batteries and ammunition. ____

6. These minerals contain phosphorus and are used in fertilizer and food for livestock. ____

7. This mineral often occurs in the form of crystals. It comes in many colors and is used to make watches and glass. ____

8. Millions of tons of these materials are used in construction projects. ____

9. You'll find this versatile mineral in coins, film, mirrors, and jewelry. ____

10. These two fossil fuels are often found together in deposits underground. ____

Secret Chambers

You can find natural, historical, and archaeological resources on BLM lands. But not all of them are out in the wide open spaces. Some can be found deep inside caves. Caves are full of natural wonders. Some cave formations have been in the works for hundreds or even thousands of years. Prehistoric peoples often found shelter in caves. They sometimes left evidence of their lifestyles behind–in the form of rock paintings and other artifacts. Caves are also home to a variety of unusual animals. Some of these animals live their entire lives in total darkness.

People come from great distances to explore caves on public lands. But they sometime leave their marks behind. Broken formations, muddy footprints, graffiti, and litter can all damage a cave's fragile ecosystem. BLM is responsible for protecting caves from visitors, but it is also responsible for protecting visitors from the dangers of caves. Passages in caves can go for miles, and visitors can get trapped or lost. BLM managers sometimes place gates over cave entrances. The gates keep people out, but the openings in the gates are big enough to let in caves' most famous residents–bats.

—Calling All Cavers!—

You can visit many BLM caves by obtaining a permit from your local BLM office. Caves can be exciting and fun to explore using very simple equipment. But caving can also be dangerous. So you have to be aware of your own safety and the protection of things inside the cave, too. Here are some important caving safety rules:

1. Always tell someone where you are going and when you plan to return.
2. Never go caving alone.
3. Go with an experienced caver, preferably someone who is familiar with the cave you'll be exploring.
4. Take at least three light sources, with extra batteries and bulbs.
5. Remember that cave environments are very fragile. Even slight disturbances can harm cave creatures.

—Did You Know...?—

. . . that a single bat can eat thousands of insects in just one night? These flying mammals don't look for their prey in the dark. They send out pulses of sound and then listen for the echoes that bounce off even tiny insects.

Cave Pictionary

You can find some weird and amazing sights in caves, and some of them have some pretty weird names, too. Here's a mini cave dictionary, complete with pictures. Why not read the definitions and then draw your own cave with its own wild wonders?

Cave dictionary:

stalactite – a mineral deposit that grows down like an icicle from the ceiling of a cave.

stalagmite – a mineral deposit that drips onto the floor of a cave and grows upward.

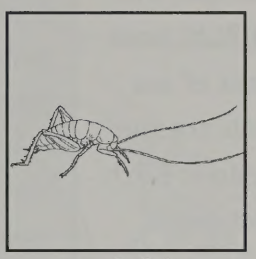
troglobite – an animal that lives its entire life in a cave, often in total darkness. Blind cave fish and cave crickets are troglobites.

troglophile – an animal that lives its entire life in a cave, but has no particular adaptations to cave life. Earthworms, scorpions, and various insects can be troglophiles.

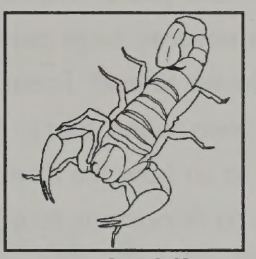
trogloxene – an animal that spends part of its life in caves, but leaves to find food. Bats are the most familiar trogloxenes.

stalactites

stalagmites



troglobite (cave cricket)



troglophile (scorpion)

trogloxene (bat)

Paleopuzzles

Would you like to follow in the footsteps of a dinosaur? Well, there are places on BLM lands where you can do just that. You won't find any living dinosaurs, of course. They died out long before any humans came along. But you might find fossils of dinosaur bones or tracks. If you do, please leave them in place. But tell someone, because scientists would really like to know about your discovery.

That's because fossils are not so easy to find. Fossil formation is a chancy process (see box at right). Even so, a large number of fossils have been found on BLM lands. In fact, many of the fossils in American museums came from public lands. Fossils belong to all of us, and they can tell us a great deal about ancient climates and landscapes. Did you know, for example, that a shallow ocean once covered large parts of BLM lands in the West? How do we know? From fossils of sea creatures that have been found there. Fossils are the best clues we have as to how life developed on Earth. And that's why it's so important to protect these ancient treasures.

Making a Good —Impression—

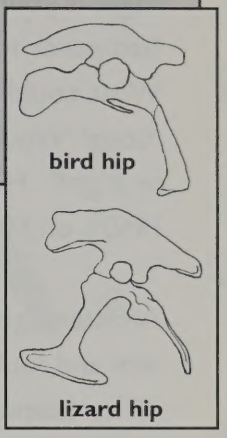
It takes just the right conditions over a long period of time for fossils to form. In the first place, the remains of dead plants and animals have to be buried fairly quickly–perhaps under mud or volcanic ash. Once buried, the remains have to stay undisturbed for a long time. It might take centuries for remains to become petrified. This occurs when living material is replaced by dissolved minerals, which then harden. Fossils can also form by the mold-and-cast process, which occurs when sediments around an object harden. When the object decays, an empty space, or mold, is left. If the mold fills with other sediments, which then harden, a cast is formed.

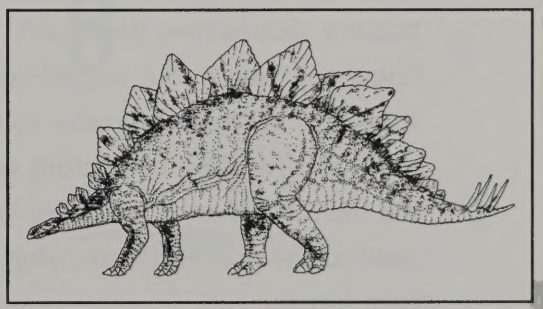
Boneyard Mystery

Scientists called paleontologists study fossils. The fossils they find are often all mixed up. There might be bones from several different dinosaurs scattered around a particular site, for instance. Or scientists might find only a few fossilized bones with no trace of the remaining animal. They hardly ever find a complete dinosaur skeleton.

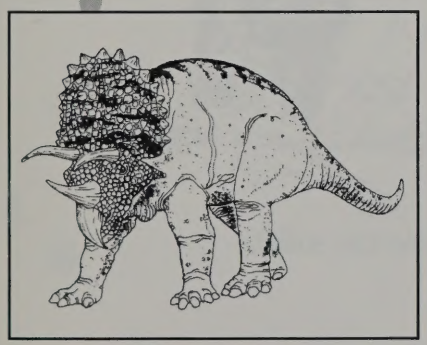
But you're in luck! Paleontologists have sorted through the bones here and put together a dinosaur skeleton. Now it's up to you to figure out what kind of dinosaur it is. Examine the bones and compare them to the drawings of the dinosaurs below. Which one do you think it is? Pay close attention to the skull, the leg bones, and the tail. If you need another hint, check the information about dinosaur hips in the box at right.

Dinosaurs had hips that resembled either modern-day birds or lizards. Bird-hipped dinosaurs were almost all vegetarians; their teeth were well-suited to eating foliage. Lizard-hipped dinosaurs included all the meat-eaters, as well as the huge plant-eaters such as *Apatosaurus*.

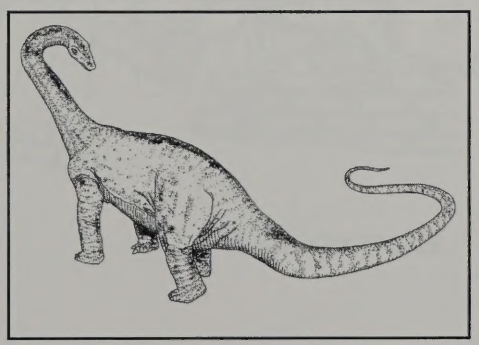




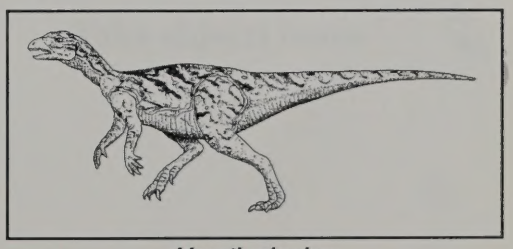
Stegosaurus



Pentaceratops



Apatosaurus



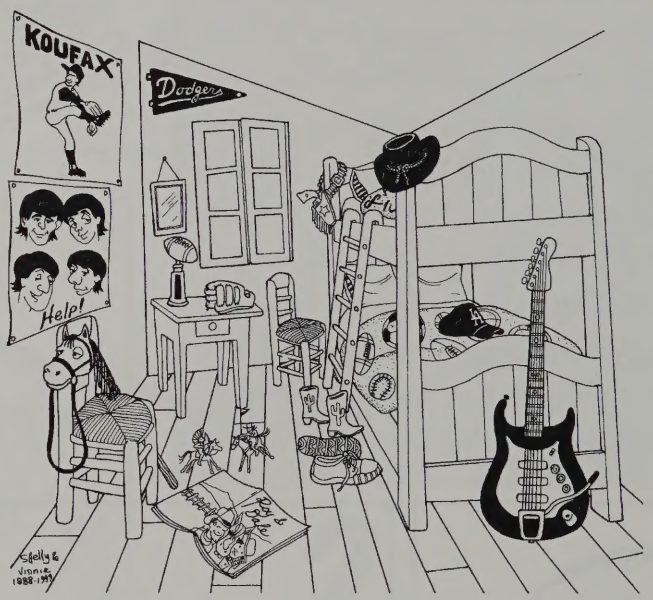
Hypsilophodon

Time Travel

Scientists called archaeologists study clues to human history. You can think like an archaeologist. Imagine that one of the bedrooms on the right is yours. Now imagine that someone who had never met you before saw your bedroom. What could they tell about you, just by seeing your room? Would the person know if you were a boy or a girl? How old you were? If it was during the 1960's or 1990's? What your hobbies were?

Archaeologists work the same way. They study a site and look at all the things people left behind. They keep detailed records about everything they find, and handle ancient objects very carefully. They put together hundreds of clues to get the whole story.

But what would happen if some of the clues were missing? Unfortunately, this happens all too often. There are so many archaeological sites on BLM lands that it's impossible to watch over them all. People take things such as arrowheads and pieces of pottery. Sometimes they don't know any better. But sometimes they steal things on purpose to add them to their own collections or to sell them for money. They are taking clues to the past and destroying them forever.



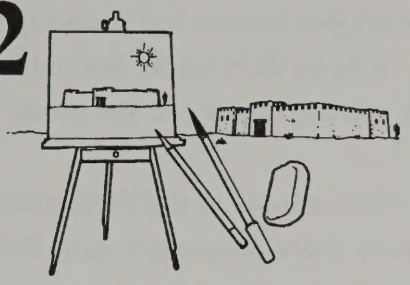
The Past: Can You Dig It?

Archaeologists are specially trained to uncover clues to human history. Visitors to public lands should never dig up or take ancient artifacts. But there are ways you can help protect clues to the past. Look at the pictures below and circle those actions that you can take to protect clues to America's past. Draw an X through actions that would harm those clues.

1

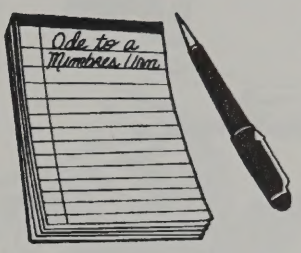
Draw graffiti

2



Paint a picture

3



Write a story

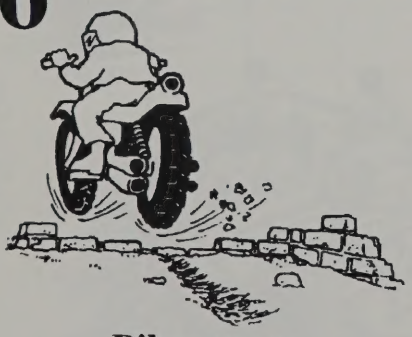
4

Spray paint

5

Take a photo

6

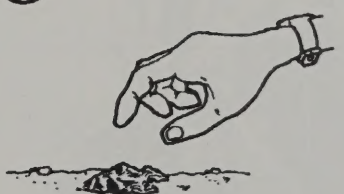


Bike across

7

Walk on walls

8



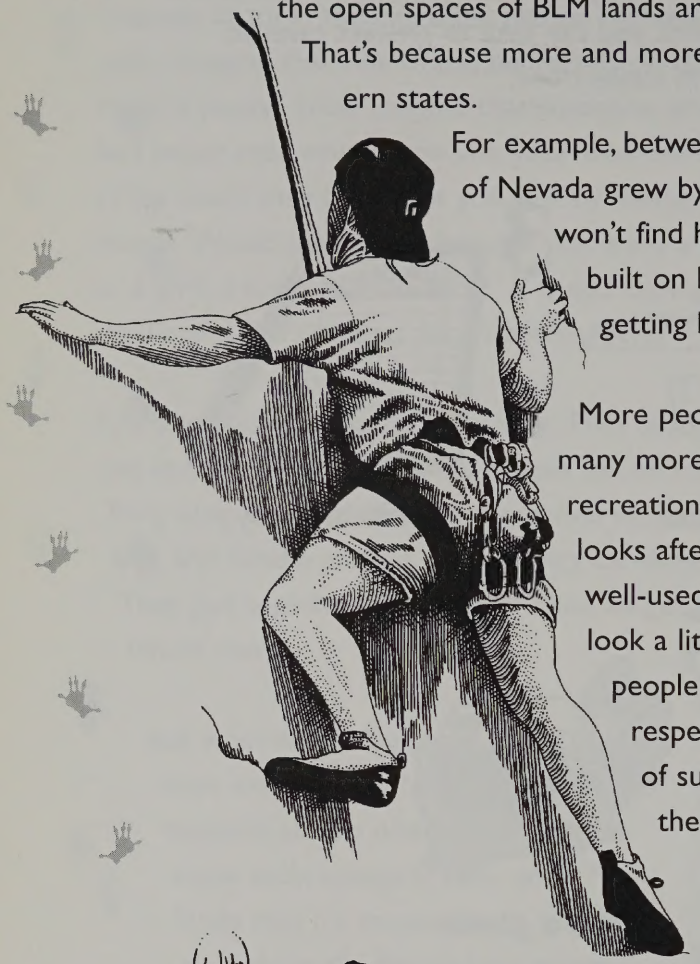
Take objects home

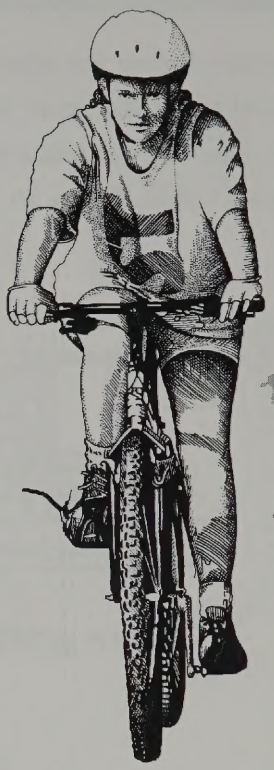
The Big Squeeze

106 million hectares (262 million acres) sounds like a lot . . . and it is. But the open spaces of BLM lands are no longer quite so empty. That's because more and more people are moving to the western states.

For example, between 1990 and 2000, the population of Nevada grew by more than 65 percent. You won't find houses and shopping malls being built on BLM lands. But public lands are getting busier just the same.

More people in the West means that many more people are using BLM lands for recreation. You know how a soccer field looks after a long, hard season? Some well-used areas of BLM lands can begin to look a little worn out, too, especially if people don't treat the lands with respect. (See page 36 for a list of suggestions on how to treat the lands with respect.)





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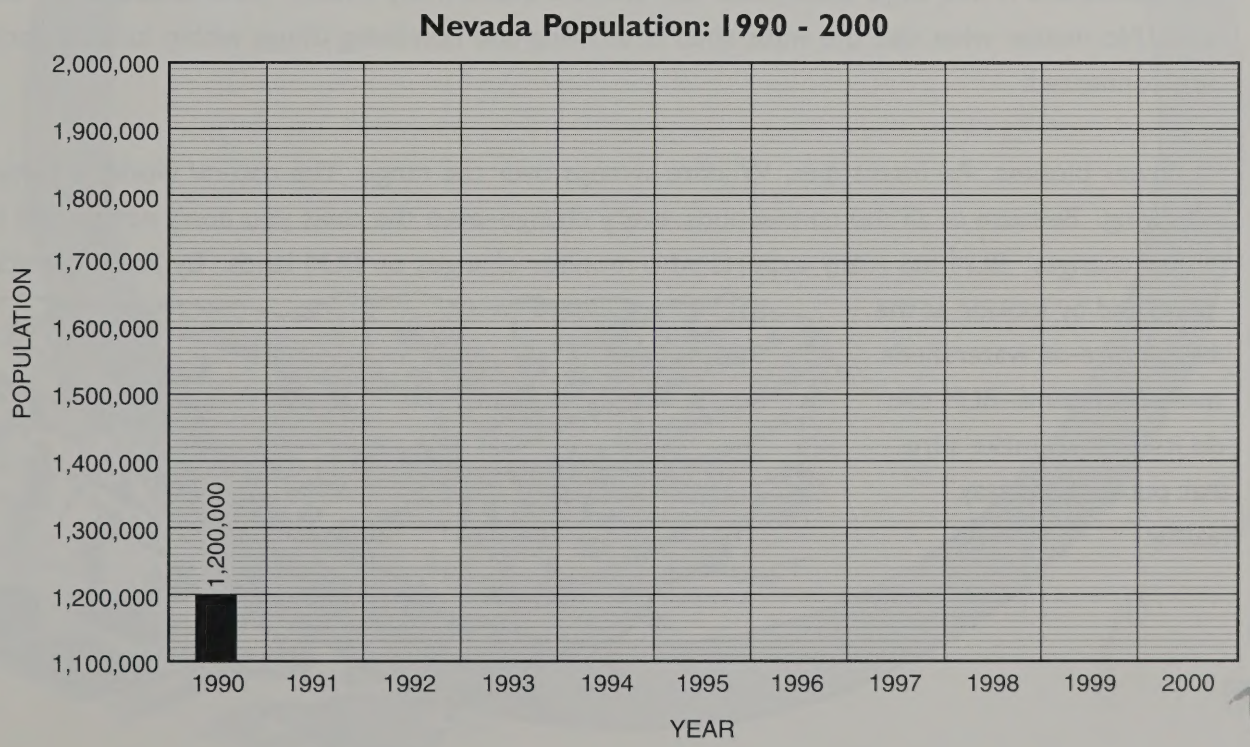
Climbing the Chart

Below is a table showing the population of Nevada (rounded to the nearest 10,000) for each year from 1990-2000. Using the grid provided, create a bar chart showing the population increase over time. We've drawn the first bar to get you started.

Year	Population
1990	1,200,000
1991	1,320,000
1992	1,370,000
1993	1,430,000
1994	1,530,000
1995	1,610,000
1996	1,700,000
1997	1,790,000
1998	1,870,000
1999	1,950,000
2000	2,000,000

Nevada population (from Nevada State Demographer and U.S. Census Bureau)

For an added challenge, look up some population figures for Utah. Add this information to your chart using another color. Is Utah's population also growing fast?



The Big Picture

You've learned about many of the natural, historic, and prehistoric resources that can be found on BLM lands. And you've learned about some of the many challenges BLM faces in caring for them. When it comes to solving problems–whether they have to do with wildlife or weeds or water–it's important to look at the big picture. That's because everything is connected.

Pick your favorite place on BLM lands. Look around and you'll see signs of many living things . . . and non-living things, too–all of them connected. They are part of what scientists call an ecosystem. There are many ecosystems on public lands–deserts, forests, rangelands, to name just a few. Ecosystems can be large or small. Earth is an ecosystem, and so is your backyard.

—Watershed Watch:—

If you'd like to learn more about your watershed, check out the website of the U.S. Environmental Protection Agency **(www.epa.gov/adopt/)**. You can enter your zip code and find out about your watershed and how you can help protect it.

Ecosystems are one way to look at the big picture. Another way is to look at large areas that are drained by rivers. These are called watersheds. When it rains or when snow melts, the water soaks into the ground or it moves downhill to a body of water–a stream, river, or lake. As the water moves across and through the land, it picks up and carries sediments, minerals, and pollutants. These end up in our groundwater or our waterways.

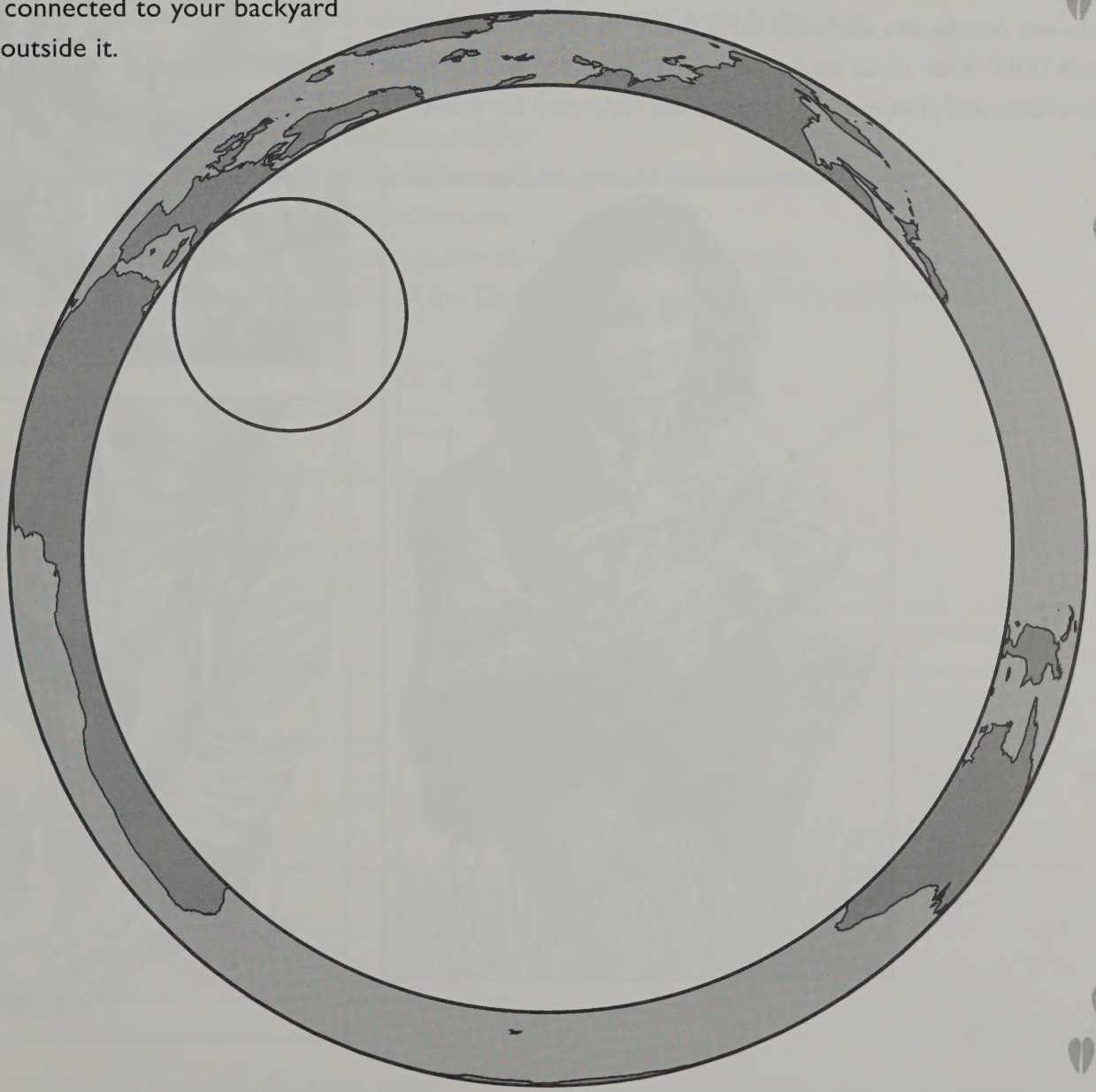
Like an ecosystem, a watershed can be large or small. In the drawing below, the area outlined by the dotted line is one large watershed. But there are also many smaller watersheds within the big one. No matter what size the watershed is, all living and non-living things within its boundaries are connected.

A flower blooms. An insect dies. Wildfire sweeps over the range. The natural world is always changing. Because of all the connections, every change–even the ones you don't notice–will cause other changes. BLM has many experts who monitor changes on BLM lands. By keeping track of them and by looking at the big picture–at watersheds and ecosystems–BLM can do its best to make sure that public lands stay healthy.

Making Connections

Go outside . . . anywhere. Stop and look. What connections can you find? Chances are you can see plenty of them right in your own backyard, school yard, or local park–a bird eating some berries, perhaps, or a squirrel gathering acorns. Your backyard is a small ecosystem. But does it have connections beyond your backyard? Absolutely! The squirrel might live in a nearby forest. And who knows where the bird might have traveled? Maybe it spends winters in South America or summers in Alaska. It depends on the berries in your backyard for food. But it's also part of the "big picture" that BLM and everyone needs to be aware of.

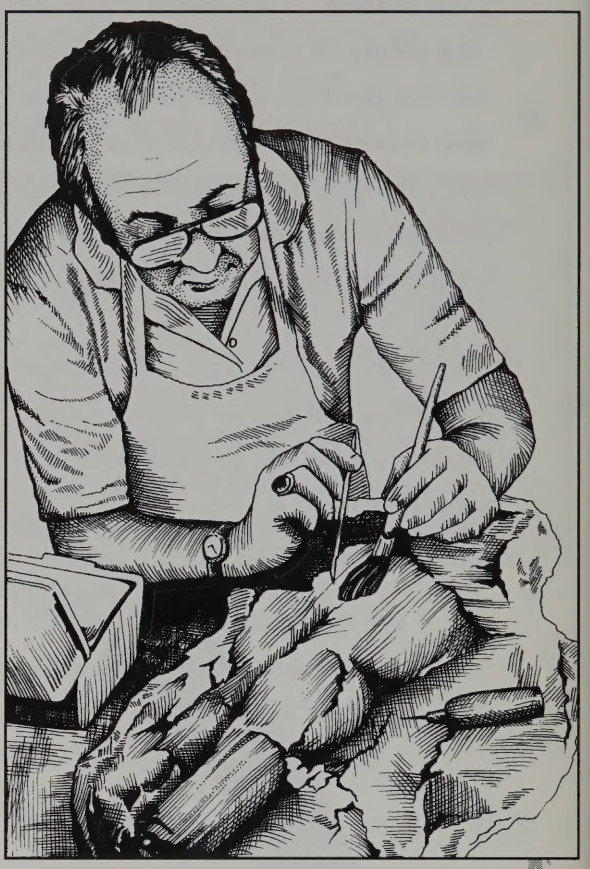
Think about connections. Then draw pictures in the empty circles below. In the small circle, show two or more things in your backyard that are connected. In the larger circle, show some things that are connected to your backyard but are outside it.

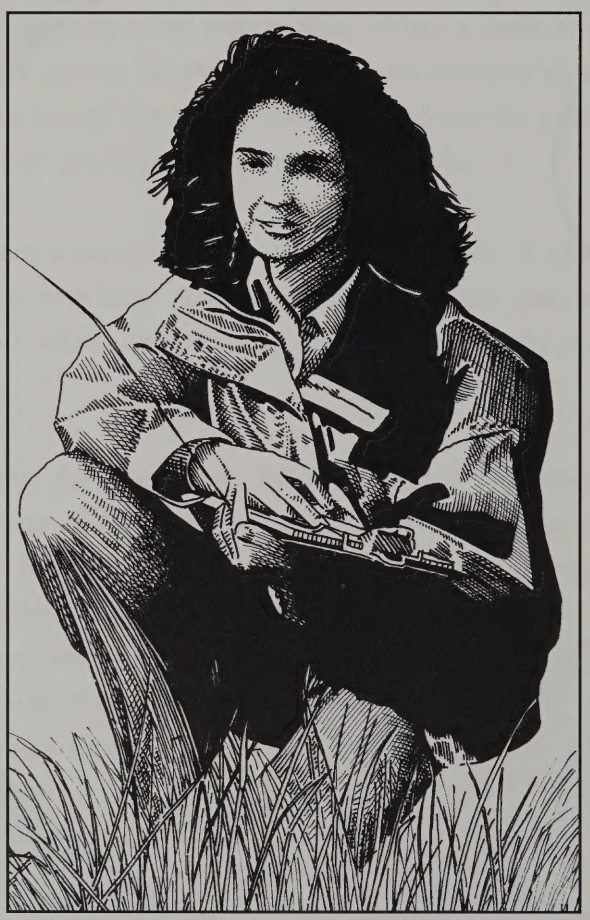


Help Wanted

As you've seen, BLM has huge areas of land to protect and many resources on that land to care for. Experts in many different resources work for BLM. There are experts in minerals, animals, plants, recreation, and many other fields. By working together, BLM employees can do what's best to protect public lands now and in the future.

With so much land to manage, it's a big job. And BLM doesn't just need experts to do it. All sorts of people can help. As you've seen, people create some of the problems that exist on BLM lands, and people can also help solve them. In other words, BLM needs YOU! After all, as you've learned, public lands belong to all Americans, and that means everyone can help care for them.





ACTIVITY

Career Fair

Archaeologist. Biologist. Botanist. Fire Specialist. Forester. Geologist. Hydrologist. Paleontologist. Ranger. Surveyor.

There are many different people who work to protect the historical, archaeological, and natural resources on public lands. We've come up with brief "job descriptions" for some of them, but you need to match them with the job titles listed above. Once you fill in the spaces below, the letters in the boxes will help you answer the question at the bottom of the page.

1. I study forests and manage the forest resources on public lands.
2. I work to determine land ownership and boundaries.
3. I use clues humans left behind to learn about how people lived in the past.
4. I manage fires and work to educate people on fire safety.
5. I study and protect water resources.
6. I work to protect habitat for fish and wildlife.
7. I patrol the public lands to protect them and the people who use them.
8. I study fossils to learn about life in the past.
9. I study plants and work to protect native plants from invasive weeds.
10. I study the structure and history of the Earth and help manage mineral resources on public lands.

1. ___ ___ ___ ☐ ___ ___ ___ ___

2. ___ ___ ___ ☐ ___ ___ ___ ___

3. ___ ___ ___ ___ ___ ☐ ___ ___ ___ ___ ___ ___ ___

4. ___ ___ ☐ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

5. ___ ☐ ___ ___ ___ ___ ___ ___ ___ ___ ___

6. ___ ___ ☐ ___ ___ ___ ___ ___ ___

7. ___ ___ ☐ ___ ___ ___

8. ___ ___ ___ ☐ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

9. ___ ___ ___ ___ ___ ☐ ___ ___

10. ___ ___ ___ ___ ___ ___ ___ ☐ ___

Who is responsible for caring for public lands? _____!

Doing Your Part

There are things everyone can do to help care for BLM lands when they visit. Follow the Leave No Trace principles, listed below. You can learn more about how to Leave No Trace by visiting the website at www.lnt.org.

1. Plan Ahead and Prepare

Know the rules and learn about the area you'll be visiting.

2. Travel and Camp on Hard Surfaces

Using hard surfaces prevents damage to soil and plants. Hard surfaces are established trails and campsites, rock, gravel, dry grasses, and snow.

3. Dispose of Waste Properly

Use trash cans for your garbage. If you are visiting an area where there are no trash cans, then take all trash away with you, including leftover food, litter, and toilet paper, in a sealed plastic bag. Human waste should be buried in a small hole 15-20 cm (6-8 inches) deep and at least 60 meters (200 feet) from water, camp, and trails.

4. Leave What You Find

Leave rocks, plants, arrowheads, and other objects so that others can enjoy them, too. Do not build structures or dig trenches.

5. Be Careful With Fire

Use a lightweight stove for cooking and enjoy a candle lantern for light. Where fires are allowed, use fire rings that are already there and keep fires small. Only use sticks from the ground that can be broken by hand. Be sure to burn all wood and coals to ash, put out campfires completely, and then scatter cool ashes. (And remember: Adults should always be involved in building, burning, and putting out campfires.)

6. Respect Wildlife

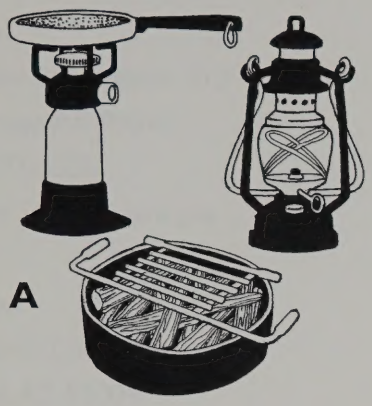
Watch wildlife from a distance and don't follow or approach animals. Never feed animals. Control pets at all times, or better yet, leave them at home.

7. Be Considerate of Others

Respect other visitors and remember that they want to enjoy the outdoors, too. Take breaks and make camps away from trails and other visitors. Let nature's sounds–not radios or music players–be the ones heard. Avoid loud voices and noises.

Leave No Trace

To the left and to the right are some pictures illustrating the Leave No Trace principles. Draw a line from each of the principles in the center to the picture that best illustrates it.



A

1. Plan Ahead and Prepare
2. Travel and Camp on Hard Surfaces
3. Dispose of Waste Properly
4. Leave What You Find
5. Be Careful With Fire
6. Respect Wildlife
7. Be Considerate of Others

G

B

F

C

D

E

So you'll always remember:
Make a small wallet card of the Leave No Trace principles or order one from the LNT website (www.lnt.org). Carry it with you so you'll remember how to take good care of BLM lands and all the lands you might visit.

Appendices

BLM State Offices

Alaska
222 West 7th Avenue, #13
Anchorage, AK 99513
(907) 271-5555
Website: www.ak.blm.gov

Arizona
222 North Central Avenue
Phoenix, AZ 85004
(602) 417-9200
Website: www.az.blm.gov

California
2800 Cottage Way, Suite W-1834
Sacramento, CA 95825
(916) 978-4400
Website: www.ca.blm.gov

Colorado
2850 Youngfield Street
Lakewood, CO 80215
(303) 239-3600
Website: www.co.blm.gov

Eastern States
7450 Boston Blvd.
Springfield, VA 22153
(703) 440-1600
Website: www.es.blm.gov

Idaho
1387 South Vinnell Way
Boise, ID 83709
(208) 373-4000
Website: www.id.blm.gov

Montana/Dakotas
5001 Southgate Drive
Billings, MT 59101
(406) 896-5000
Website: www.mt.blm.gov

Nevada
1340 Financial Blvd.
Reno, NV 89502
(775) 861-6400
Website: www.nv.blm.gov

New Mexico
1474 Rodeo Road
Santa Fe, NM 87505
(505) 438-7400
Website: www.nm.blm.gov

Oregon/Washington
333 S.W. 1st Avenue
Portland, OR 97204
(503) 808-6002
Website: www.or.blm.gov

Utah
324 South State Street
Salt Lake City, UT 84145
(801) 539-4001
Website: www.ut.blm.gov

Wyoming
5353 Yellowstone Rd
Cheyenne, WY 82003
(307) 775-6256
Website: www.wy.blm.gov

Answers to Activity Pages

p. 5 Map Talk
Answers will vary, depending on the state in which you live. Among the states that have a lot of BLM land are Alaska, Nevada, Utah, and Wyoming.

p. 7 I Spy Scramble
fish, birds, mammals, reptiles, insects, flowers, trees, mountains, deserts, glaciers, rivers, caves, oil wells, fossils, arrowheads.
Answer to question: shopping malls

p. 11 Where's Weedo?

p. 13 Little House Near the Wildlands
Hazards include: hole in chimney; leaves and branches on roof; logs stacked near house; gasoline near house; car, tall grasses, and weeds near house; debris in yard; tree hanging over roof

p. 15 Down by the Riverside
Activities that will help keep riparian area healthy are: hikers crossing stream single file; road built far back from stream; fencing off stream area from cows; logging of a few trees far from the stream edge

p. 17 see next column

p. 19 Habitat Match-up

Forest – bear	Tundra – caribou
Desert – lizard	Grassland – prairie dog
Stream – salmon	Wetland – frog

p. 21 Mustang Roundup
Nevada – 17,930; Wyoming – 5,364; California – 4,218; Oregon – 2,885; Utah – 2,621; Arizona – 2,613; Idaho – 697; Colorado – 620; Montana – 170; New Mexico – 68

Idaho, Colorado, Montana, and New Mexico would be colored yellow; California, Oregon, Utah, and Arizona would be blue; Wyoming would be green; and Nevada would be red.

p. 17 Finding Forest Friends

p. 23 Minerals Match
1.E 2.H 3.B 4.D 5.J 6.G 7.A 8.F 9.C 10.I

p. 27 Boneyard Mystery
Hypsilophodon

p. 29 The Past: Can You Dig It?
Numbers 2, 3, and 5 should be circled. Numbers 1, 4, 6, 7, and 8 should be crossed out.

p. 35 Career Fair
1. Forester 2. Surveyor 3. Archaeologist 4. Fire Specialist 5. Hydrologist 6. Biologist 7. Ranger 8. Paleontologist 9. Botanist 10. Geologist

Answer to question: Everyone is!

p. 37 Leave No Trace
1.E 2.F 3.C 4.D 5.A 6.G 7.B

★U.S. GOVERNMENT PRINTING OFFICE: 2004-673-016/50544

U.S. Department of the Interior
Bureau of Land Management